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RELATIONSHIPS BETWEEN MELODIC ERROR DETECTION, MELODIC DICTATION, AND MELODIC SIGHTSINGING

Richard C. Larson

This study investigated the competencies of undergraduate music majors in the three aural skills of melodic error detection, melodic dictation, and melodic sightsinging. Three criterion-referenced aural tasks were developed for comparative evaluation of these competencies within the single musical parameter of pitch for diatonic, chromatic, and "atonal" melodic styles. Significant relationships were obtained among nearly all task and subtask scores, although the relationships were generally higher between error detection and dictation scores than between error detection and sightsinging scores. It also was found that differing melodic styles affected task difficulty but did not have an appreciably different effect upon the relationships between tasks.

Key Words: aural discrimination, music students, music theory, sight reading.

The purpose of this study was to examine the relationships among the levels of competency achieved by a random sample of junior and senior college music majors in the three aural skills of melodic pitch error detection, melodic pitch dictation, and melodic pitch sightsinging. A subsidiary purpose was to study the influence of differing melodic styles upon achievement in these three aural skills.

The study was based on the premise that one of the most important skills for success in music teaching is the ability to identify errors in student performance. Ear training instruction in college music programs often attempts to develop aural discrimination abilities through experiences in dictation and sightsinging, to the neglect of developing abilities to detect performance errors.

This article is based on the author's doctoral dissertation, "The Relationships Among the Academic, Musical, and Aural Abilities of Fredonia College Music Majors" (Urbana: University of Illinois, 1976),

An examination of the research literature supports this premise (Sidnell, 1968; Costanza, 1968; McMullen and Bauman, 1975), but it also reveals that the relationships between traditional ear training skills and the more functional skills of score reading or error detection are not fully recognized. The typical contents of instruction in music theory and ear training have been questioned (Sherman et al, 1967; Costanza, 1968; Sidnell, 1968; Fitch, 1970) and the need for further research into the relationships between distinct aural skills has been suggested (Ottman, 1956; Sherburn, 1965; Shaw, 1971; Thostenson, 1971).

The precise direction of the investigation was further influenced by the observation that, of all the parameters present in most music contexts, pitch is of basic importance to discrimination, and is central to most ear training instruction. The procedures used in this study attempted to control or exclude the influences of all musical parameters other than pitch.

Subjects

This study involved 204 subjects from a total population of 522 undergraduate music majors enrolled during the 1974 fall semester at the State University College at Fredonia, New York. Descriptive data for the principal conclusions were gathered from the evaluation and classification of 72 subjects randomly selected from a total population of 174 junior and senior level music majors at this institution. Juniors and seniors were used because the completion of the required four semesters of music theory and ear training could be assumed. The remaining 132 subjects were used during the earlier stages of developing content and procedures for evaluation and description. These subjects were drawn from various class levels, from freshman to the graduate level, and were selected largely on the basis of availability as groups or classes.

Materials

This study, primarily exploratory and descriptive in nature, did not involve the development of a meticulously constructed "achievement test." The use of existing instruments for a comparative examination of student competency in the three aural skills was explored and rejected, largely because of content. The musical contents of these devices show little apparent relationship with each other and could thereby introduce content variables capable of obscuring the presence of any real relationships or differences among these aural skills. It was decided instead to construct three local criterion-referenced instruments (referred to as aural tasks) for describing aural skills competencies within the single musical parameter of pitch, based upon materials actually used in classroom ear training instruction.

Melodies for task items were selected from published sightsinging texts on the recommendations of three music theory and two music education teachers. These melodies were classified as diatonic, chromatic, or "atonal" according to the following definitions, to include a wide range of item

difficulty and to examine the influence of differing melodic styles upon aural achievement. *Diatonic*—using only pitches of the major scale with no accidentals; *chromatic*—containing some accidentals implying secondary dominants, temporary modulations, or chromatic harmony, but having a clear feeling for a tonal center; *atonal*—no strong feeling for a tonal center between the beginning and ending tones.

The melodies were transcribed or “altered” according to the following criteria, to control or exclude the effects of all musical parameters other than pitch. All melodies were in the key of C major; written on the treble staff; eight measures in length; within a maximum range of from G below the staff to fourth space E; in common time; at the same tempo ($\text{J} = 66$); single-line, unaccompanied; of the same beginning and ending pitch (C); performed by the same timbre (electronic organ); and comprised of the same rhythmic values (unitary quarter notes).

The melodies finally used in the three tape recorded evaluative tasks were selected through seven pilot trials upon varying student populations over a period of 18 months preceding the administration of the main study. Randomization procedures were used for the sequence of melodies in each task and for the locations of errors in the error detection task. These 12 melodies were selected from a pool of 60 melodies (20 for each melodic style) on the basis of faculty recommendations for content and the examination of task items for difficulty, discrimination, internal consistency, and effects of item sequence.

All three tasks shared common items in the interest of gaining possibly more valid cross-abilities comparisons. Practical concerns for task length and ease of administration, however, necessitated tasks of unequal numbers of items. The dictation task contained half as many items as the error detection

Table 1
Error Detection, Dictation, and Sightsinging:
Total Task and Subtask Corrected Odd-Even Split-Half r ,
Kuder-Richardson 21 r , Test-Retest r

Task	r_{xx}	r_{KR21}	r_{AA}
Error total	.84	.78	.88
Error diatonic	.80	.61	.79
Error chromatic	.65	.44	.67
Error atonal	.73	.53	.60
Dictation total	.95	.87	.93
Dictation diatonic	.95	.85	.94
Dictation chromatic	.89	.78	.70
Dictation atonal	.76	.63	.80
Sightsinging total	.86	.79	.82
Sightsinging diatonic	.83	.83	.90
Sightsinging chromatic	.89	.77	.84
Sightsinging atonal	.66	.60	.74

task and the sightsinging task contained half as many as the dictation task. These inequalities did not constitute a major weakness as satisfactory reliability coefficients resulted from a corrected odd-even, split-half, Kuder-Richardson formula 21, and a test-retest (Table 1). In addition, interjudge and intrajudge reliabilities of .89 and .79 were obtained for the sightsinging task by three independent judges on two ratings of a random sample of 30 subjects, with tape recorded identification numbers changed.

Content and criterion-related validities were determined on the bases of the sources of melodies; selection of melodies through the recommendations of appropriate faculty; significant correlations with grade point averages and instructor ratings as selected criteria of musical and aural achievement; and the group-differentiating power of the error detection task as analyzed with an *F* test for the significance of differences between mean scores of seniors and sophomores ($N = 103$).

Procedures

The three aural tasks were administered during the 1974 fall semester at the State University College, Fredonia, New York. Ninety subjects were randomly selected from 174 juniors and seniors and randomly assigned in equal number to one of three evaluative cells. Tasks were administered at approximately two-week intervals, with a different sequence of tasks for each cell.

The error detection and dictation tasks were group administered by the investigator. For each of these tasks, students received a printed sheet of instructions, one practice example in each of the three melodic styles, and a task response booklet. Instructions also were read aloud by the investigator to ensure complete understanding. All task items were played from a tape recording. The sightsinging task was individually administered by the investigator and a graduate assistant. Student performances were tape recorded, with subjects identified only by a number for later independent scoring by three music theory instructors.

Each common time music measure was treated as an individual item and scored as either "right" or "wrong." Raw scores were based upon the number of items correctly written, performed, or marked "same" or "different" for the dictation, sightsinging, and error detection tasks, respectively. The raw score for each melody/melodic style/task was the sum of scores for individual items within that melody/melodic style/task. Scores used in data analyses then consisted of melody scores, melodic style scores, and total task scores.

Subject mortality was greater than expected due to factors beyond the control of the investigator (mainly higher-than-usual absenteeism or tardiness due to inclement weather and seasonal illnesses) and limited opportunities for make-up administrations. Completed main sample data were obtained as follows: error detection— $N = 70$, dictation— $N = 81$, and sightsinging— $N = 65$, for an average of $N = 72$. Data were analyzed with standard computer programs from the Statistical Package for the Social

Sciences and the Multiple Analysis Program System for Behavioral Science Research (University of Buffalo) for correlation, analysis of variance, and factor analysis, utilizing program options for the pair-wise deletion of missing data. A statistical probability level of .05 or less was selected for interpreting the relationships among variables.

Results and Discussion

Table 2 shows that student achievement was generally highest, while the influence of differing melodic styles upon task difficulty was generally lowest, in the following order of tasks: error detection, sightsinging, and dictation. Consideration was given to the possibility that some amount of these differences might be attributed to inexactitude in scoring procedures rather than to any real differences between aural skills or melodic styles. An analysis of variance therefore was performed, revealing significant differences between tasks and between styles ($p < .0001$), significant interaction between tasks and styles, and minimal error variance. In view of the data presented in Table 2 (see especially the low means and high standard deviations for dictation and sightsinging atonal scores, possibly indicating random responses) and data previously gathered for item difficulty and discrimination, these significant differences were interpreted as primarily due to differences in difficulty.

A consideration of this finding and the inference from Table 3 that differing melodic styles did not significantly alter the relative score distributions in the sample (as shown in the resultant significant correlations between aural tasks) supports the position that the content of instruction and evaluation in ear training need not be posited on the so-called common practice period, and that such instruction ought to include experience in more complex tonal idioms (Sherman et al, 1967; Fitch, 1970).

Table 3 shows significant relationships, regardless of melodic style, between nearly all scores in error detection, dictation, and sightsinging. The relationships generally were higher between error detection and dictation scores than between error detection and sightsinging scores. For example, the

Table 2
Means and Standard Deviations

Score	Error Detection		Dictation		Sightsinging	
	\bar{X}	S	\bar{X}	S	\bar{X}	S
Total	70.65 (96)	8.83	17.08 (48)	9.90	13.70 (24)	4.67
Diatonic	25.61 (32)	3.56	8.86 (16)	4.78	6.37 (8)	2.11
Chromatic	24.00 (32)	3.33	5.80 (16)	4.13	4.65 (8)	2.24
Atonal	21.04 (32)	3.29	2.42 (16)	2.44	2.65 (8)	1.66

Maximum scores are in parentheses.

Table 3
Aural Task Relationships: Pearson Correlation Matrix

Variable Name	Variable											
	1	2	3	4	5	6	7	8	9	10	11	12
1. I:T	1.00	.90*	.89*	.82*	.80*	.75*	.71*	.57*	.62*	.43*	.65*	.37*
2. I:A	.90*	1.00	.74*	.57*	.75*	.80*	.61*	.44*	.58*	.41*	.63*	.29
3. I:B	.89*	.74*	1.00	.56*	.76*	.69*	.69*	.55*	.55*	.36*	.62*	.29
4. I:C	.82*	.57*	.56*	1.00	.59*	.45*	.57*	.52*	.50*	.34*	.44*	.40*
5. II:T	.80*	.75*	.76*	.59*	1.00	.90*	.91*	.75*	.77*	.57*	.72*	.49*
6. II:A	.75*	.80*	.69*	.45*	.90*	1.00	.70*	.51*	.72*	.61*	.67*	.37*
7. II:B	.71*	.61*	.69*	.57*	.91*	.70*	1.00	.63*	.71*	.49*	.71*	.44*
8. II:C	.57*	.44*	.55*	.52*	.75*	.51*	.63*	1.00	.55*	.33*	.45*	.52*
9. III:T	.62*	.58*	.55*	.50*	.77*	.72*	.71*	.55*	1.00	.80*	.80*	.69*
10. III:A	.43*	.41*	.36*	.34*	.57*	.61*	.49*	.33*	.80*	1.00	.45*	.35*
11. III:B	.65*	.63*	.62*	.44*	.72*	.67*	.71*	.45*	.80*	.45*	1.00	.33*
12. III:C	.37*	.29	.29	.40*	.49*	.37*	.44*	.52*	.69*	.35*	.33*	1.00

*p < .05 (two-tailed)

Key: I—error detection; II—dictation; III—sightsinging
T—total; A—diatonic; B—chromatic; C—atonal

percentage of common variance ($r^2 \times 100$) between error detection and dictation total scores was 64, but was 38 between error detection and sightsinging total scores. Subsequent principal components factor analyses with both oblique and orthogonal rotations provided additional support for the existence of a higher relationship between error detection and dictation scores than between error detection and sightsinging scores. Although this higher relationship cannot be convincingly supported by the data of this investigation, its possibility should indicate a need for further research in the area of aural skill development.

These results lend support to the opinions that ear training instruction ought to (1) provide experience in the development of error detection skills in addition to the traditional experiences in dictation and sightsinging (Costanza, 1968; Sidnell, 1968; McMullen and Bauman, 1975), (2) regard dictation as an important contributory means of aiding in the prognosis and development of more purely functional aural-visual discriminatory abilities (Thostenson, 1971) rather than as an important terminal competency (McMullen and Bauman, 1975), and (3) value sightsinging in itself as a specific terminal competency (Ottman, 1956; Thostenson, 1971; and McMullen and Bauman, 1975).

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